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Detection of Gestures based on Virtual Keyboard and Mouse using Computer Vision

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ABSTRACT: In the era of Computer vision, we make use of gestures for Recognizing some inputs from the user who is sitting in front of the computer with the help of webcam. In our daily examples of our day to day life we have seen various Movement recognition systems like Object Detection, Face Mask Detection, etc. In this project, we have implemented an idea of virtual mouse and keyboard by hand movement recognition. So the person sitting in front of the webcam can give inputs using hand movement and the keyboard will work based on input gestures. Various functions can be performed such as, to swipe in right direction or left direction, alphabet can be selected using one finger gesture. Similarly, mouse can be controlled by eye movements and can perform right click and left click using eye movement, cursor can be control. This project will have virtual mouse and keyboard without any requirement of actual hardware mouse and keyboard, only webcam will be the hardware aspect. In this project we have done coding in Python using Anaconda framework. The webcam will be able to read the gestures of the user and will perform the operations for virtual mouse and keyboard. The algorithm use in project is Haar cascade, which helps to detect object in images. OpenCV library is used to create video capture object.

KEYWORDS : Haar cascade, Hand Movement, OpenCV, Virtual, Gesture, Anaconda

I. INTRODUCTION

The webcam will capture the gesture of a person and can act as virtual keyboard and mouse, through fingertip recognition technique. The person sitting in front of webcam can simply handle the mouse functions and keyboard functions using hand gestures. By the use of OpenCV library the video capture object is created and webcam will be started. Mouse functions are performed using face detection based on eye gestures the virtual mouse is implemented. PyAutoGui is used, which provides the ability to stimulate mouse cursor moves. For virtual keyboard, Pynput keyboard is a library of python, used to give the accessibility to capture the keyboard inputs. The hand movements are captured by Haar cascade algorithm, which uses OpenCV and mediapipe for detection purpose. In this project, we are using Haar cascade classifier, which is a machine learning object detection program, that detects objects in an image or video. This algorithm helps to identify objects in images, irrespective of their scale in image and location. We can train a Haar cascade, to detect various objects like vehicles, humans, animals, etc. So, Haar cascade will be able to identify the hand gestures of a person and will act accordingly.

II. LITERATURE SURVEY

Sixth Sense technology is a gesture based wearable interface that links the digital information around us with the physical world and it allows us to use our natural hand gestures to communicate or interact with the digital information. Several approaches have been presented on the concept of virtual mouse with different ideas. The approaches were done in which involved the concept of Image Processing and Image Acquisition. According to the study, the motto is to make a virtual mouse which is mainly useful for saving manual work.



1. **Jacky Yang, Michael Chan, Alvaro Uribe-Quevedo, Bill Kapralos, Norman Jaimes, Adam Dubrowski, MaxSimHealth, “ Virtual Reality Interactions in Medical Simulation Employing Speech Recognition” Issue in (2020)**

In this paper, we have presented a virtual eye fundus examination scenario employing speech recognition as a tool to facilitate communicating instructions to a virtual patient.

The user can provide instructions orally or through non-verbal cues employing head nods and hand gestures. From a demo session held at a local hospital open house, we can conclude that face validity of VR is high, first impression left attendees who were unfamiliar with the technology impressed about the immersive capabilities to replicate spaces. However, while promising, VR hardware, service integration, and Internet access require improvements to develop seamless speech-based user interactions. We believe that speech recognition and noise filtering require further developments to enable VR experiences outside controlled environments, which makes the technology difficult to deploy with consumer-level hardware.

2. **Purnendu Mishra, Kishor Sarawadekar,” Fingertips Detection in Egocentric Video Frames using Deep Neural Networks” Issue in(2019)**

The proposed work presented in this paper is focused on the estimation of fingertips(s) positions for the single RGB image. The video frame contains hand gestures in egocentric vision. The dataset used in the experiment have complex background conditions, varying illuminations, etc. We used the regression technique in combination with the multi-label classification concept to locate visible extended fingers in the video frame. Given a hand detected region, the proposed DNN based architecture has been able to robustly estimate the position(s) of the fingertip(s). The results show improvement in performance in comparison to the existing method on multiple fingertip detection in egocentric videos. The proposed methodology has an average forward time of 9.072 ms of fingertip detection on a 640 × 480 image. In our future work, we will focus on developing a more robust fingertips detection system with a focus on reducing the detection error.

3. **Sayanjit Singha Roy, Kaniska Samanta, Soumya Chatterjee, “Hand Movement Recognition Using Cross Spectrum Image Analysis of EMG Signals-A Deep Learning Approach” Issue in(June 2020)**

In this present contribution, a deep learning based classification framework has been proposed for the purpose of automatic recognition of real hand movements. The proposed methodology was validated on EMG signals collected from an online available database. Cross-wavelet transform was implemented to analyze the EMG signals corresponding to left hand and right hand movements. The cross-wavelet spectrum plots obtained from XWT analysis of EMG signals were fed as input to employed CNN-based classifier for the purpose of discrimination between the two corresponding hand movement categories. A pre-trained CNN architecture namely ‘GoogleNet’ was used in this work through transfer learning process for classifying the EMG signals and in the classification stage, a cross-subject validation technique was also adopted to increase the robustness of the proposed approach. A reasonably high degree of classification accuracies were achieved in segregating the respective hand movement classes. In addition to that, the train-test ratio of the data input to the classifier was also varied to observe the variation in accuracy due to change in size of the input. Furthermore, the performance of the CNN-based classifier was tested against some other widely used pre-trained CNN-architectures.

4. **Muhammad Jehanzeb, Muhammad Sajid Khan, Muhammad Ahmed Khan,” A new 3D Viewer system based on hand gesture recognition for smart interaction” Issue in (June 2021)**

Conventional input devices Like mouse and keyboard are not enough to fulfill the requirement of 3D interaction with the system. To solve these problems, a new system is developed where user able to import a 3D model. By using hand gestures to interact with the system and perform different operations on a 3D model like rotation, zoom in and out, highlight, move and capture. our system is mainly focused on the improvement of Human-Computer interaction. Finding a new and more precise way of interacting with the system without using any physical devices like mouse and keyboard.

5. **Muhammad Zeeshan Baig and Manolya Kavakli,” Qualitative Analysis of a Multimodal Interface System using Speech/Gesture” Issue in (2018)**

In this paper, an updated multi-modal interface system (De-SIGN v4) has been presented that utilizes speech and gesture inputs to draw a 3D object in AutoCAD, using Leap Motion and a microphone. The system is an upgraded

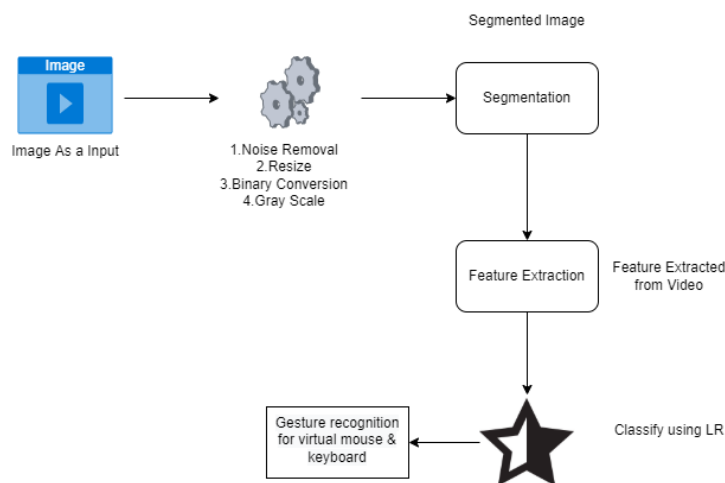
version of previous system developed by Alibay et al. [1]. After conducting experiments and evaluating the results, we found that with proper preprocessing techniques and optimization, speech and gestures can become well-coordinated inputs in human-computer interaction. The re-sults indicate that performing a task using mid-air gestures is still perceived exhausting when there is no support to hand. The usability of traditional input devices supersedes the multimodal inputs using (speech and gestures) but the gap between these two has been minimized and with advanced technology, for speech and gesture recognition it can be overcome in near future. With this updated version, a large ratio of participants, more than 90%, were able to carry out the tasks with an appropriate precision. In future work, a 3D modelling system in virtual reality (VR) will be developed in which users can see the object in a 3D space. This may reduced the training time required to learn 3D modelling skills.

III. METHODOLOGY

A] PROBLEM STATEMENT

The proposed virtual keyboard system can be used to overcome problems in real world such as situations like where there is no space for hardware keyboard to keep , a person can virtually use keyboard through fingertip recognition, can be used to secured passwords ani pins by virtual keyboard etc similarly for mouse the person who has problem in hands and are not able to control a physical mouse, eye gesture recognition technique is used here to overcome the problem.

B] SYSTEM ARCHITECTURE –



:

(Explain Flow of diagram) -

The video Image is taken as an input, the video is processed and noise is extracted from it, it is formed into pixel, later on it is resized only the object area is selected and the video is converted into binary form and the gray scaling is done which is the process of converting an image from other color spaces to shades of gray. Later on image is processed through segmentation which helps in reducing complexity of image to make further processing or analysis of the image simpler. Video image is going under feature extraction , to reduce amount of redundant data from the dataset without losing any important information then , video image is classified using lr through machine learning algorithms, then gestures are recognized form virtual mouse and keyboard.

Algorithm:-

The algorithm used in project is Haar cascade. Haar cascade is an algorithm that can detect objects in images, irrespective of their scale in image and location. This algorithm is not so complex and can run in real-time. We can train a haar-cascade detector to detect various objects like cars, bikes, buildings, fruits, etc. Haar cascade uses the cascading window, and it tries to compute features in every window and classify whether it could be an object.



Haar Cascade Classifier -: Haar cascade classifier, is a machine learning object detection program that identifies objects in an image and video.

It contains four stages that are,

- Calculating Haar Features.
- Creating Integral Images.
- Using Adaboost.
- Implementing Cascading classifiers.

Mouse -:

The proposed mouse system is based on the frames that have been captured by web cam in laptop. By the use of openCV library the video capture object is created and camera will start be started Along with media pipe object is created for face detection and based on that human eye is detected by which virtual mouse functions are performed on laptop screen. Here PyAutoGui is used which provide ability to stimulates mouse cursor moves and clicks.

Keyboard -:

In keyboard system, by the use of OpenCV the video capture object is created and web cam starts. Pynput keyboard is used which is the library of python which gives accessibility to capture the keyboard inputs. Our hand is detected using haar Cascade algorithm which uses openCv and mediapipe for detection. Once the hand gestures has been detected, by the use of controller provided by pynput, keyboard functions are performed.

IV. CONCLUSIONS & FUTURE SCOPE

The main objective of the AI virtual mouse and keyboard system is to control the mouse cursor functions by using eye blinking and control all the keyboard functions by using hand gestures instead of using a physical mouse & physical Keyboard. The proposed system can be achieved by using a webcam or a built-in camera which detects the hand gestures and hand tip and processes these frames to perform the particular Keyboard functions.

The proposed mouse & Keyboard system can be used virtually using hand gestures & eye blinking without using the traditional physical mouse & keyboard . Currently the system uses a static background, but it would be very desirable and important to use this hand tracking system in a world of augmented reality setting it in a way where a user, wearing a head-mount display, could interact with virtual 3D objects in the real-world

REFERENCES

1. <http://www.iosrjournals.org/iosrjce/papers/Vol10%20issue5/C01051016.pdf?id=139>
2. S. Sadhana Rao," Sixth Sense Technology", Proceedings of the International Conference on Communication and Computational Intelligence– 2010, pp.336-339.
3. Game P. M., Mahajan A.R,"A gestural user interface to Interact with computer system ", International Journal on Science and Technology (IJSAT) Volume II, Issue I, (Jan.- Mar.) 2011, pp.018 – 027.
4. International Journal of Latest Trends in Engineering and Technology Vol. (7)Issue(4), pp.055-062.
5. Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-4, 2017. 6. Christy, A., Vaithyasubramanian, S., Mary, V.A., Naveen Renold, J. (2019)," Artificial intelligence based automatic decelerating vehicle control system to avoid misfortunes ", International Journal of Advanced Trends in Computer Science and Engineering, Vol. 8, Issue.
6. G. M. Gandhi and Salvi, "Artificial Intelligence Integrated Blockchain For Training Autonomous Cars," 2019 Fifth International Conference on Science Technology Engineering and Mathematics (ICONSTEM), Chennai, India, 2019, pp. 157-161.
7. Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-4, 2017.
8. Praveena, M.D.A., Eriki, M.K., Enjam, D.T.," Implementation of smart attendance monitoring using open-CV and python ",Journal of Computational and Theoretical Nanoscience, Vol. 16, Number 8 pp:3290-3295 · August 2019 .
9. Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-4, 2017. 6. Christy, A., Vaithyasubramanian, S., Mary, V.A., Naveen Renold, J. (2019)," Artificial intelligence based automatic decelerating vehicle control system to avoid misfortunes ", International Journal of Advanced Trends in Computer Science and Engineering, Vol. 8, Issue.
10. J. Jaya and K. \$anushkodi, "Implementation of classification system for medical images," European Journal of Scientific Research, vol. 53, no. 4, pp. 561–569, 2011.



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